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IS 1287 (1993): Electric toasters [ETD 32: Electrical Appliances]

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बिजली के टोस्टर – विशिष्टि

(तीसरा पुनरीक्षण)

Indian Standard

ELECTRIC TOASTER — SPECIFICATION

(Third Revision)

UDC 641·526·4·06

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

November 1993 **Price Group 4**

Electrical Appliances Sectional Committee, ETD 32

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Electrical Appliances Sectional Committee had been approved by the Electrotechnical Division Council.

This standard covers general, safety and performance requirements of electric toaster for household and similar purposes to ensure personal safety against electric shock, effect of excessive temperature fire, and reliable performance and operation.

The purpose of this standard is to state and define the principal performance characteristics of electric toasters for household and similar purpose which are of interest to the user, and to describe the standard methods of measuring these characteristics and its requirements.

This standard was originally published in 1952 and was first revised in 1965. The second revision was brought out in 1986. As per the decision of the third meeting of Electrotechnical Division Council, a separate safety standard on electric toasters, grills, roasters has been brought out. In this third revision of the standard reference has been made to IS 302-2-9 (1993) about details of safety requirements.

The details of the safety requirement are given in IS 302-2-9 (1993) 'Safety of household and similar electrical appliances: Part 2 Particular requirements, Section 9 Toasters, grills, roasters and similar appliances'.

It is intended to add specific values in respect of the test on force necessary to operate bread carriage, evenness of browning control characteristics, at a later date as and when the required values are established.

However, for information and guidance to the manufacturers, the methods of test are given in respective clauses of this standard. While preparing this standard, assistance have been derived from IEC publication 442 (1973) Methods for measuring performance of electric toasters for household and similar purposes, issued by the International Electrotechnical Commission.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the results of a test, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

ELECTRIC TOASTER — SPECIFICATION

(Third Revision)

1 SCOPE

1.1 This standard covers general, safety and performance requirements for electric toasters for household and similar purposes, designed for connection to supply at voltage not exceeding 250 V ac, single phase or dc.

NOTE — Similar purposes denote are in other than household premises, e. g. coffee-houses, tea-rooms, small hotels, where the appliance is used in a way similar to that in a normal household.

2 REFERENCES

2.1 The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
302-1 (1979)	Safety of household and similar electrical appliances : Part 1 General requirements (*fifth revision*)
302-2-9 (1993)	Safety of household and similar electrical appliances Part-2, Particular requirements Section-9, Toasters, grills, roasters and similar appliances

3 TERMINOLOGY

3.1 For the purpose of this standard, the relevant definitions given under **2** of IS : 302-2-9 (1993) shall apply.

4 GENERAL REQUIREMENT

4.1 Clause **3** of IS 302-2-9 (1993) shall apply.

5 GENERAL NOTES ON TESTS

5.1 Clause **4** of IS 302-2-9 (1993) shall apply.

5.2 Unless otherwise specified, the measurements are made under the following conditions in a substantially draught free room and at a distance of at least 30 cm away from walls, on a dull black painted wooden supports.

- Ambient temperature : 27 ± 5°C
- Input : rated input

6 RATINGS

6.1 Clause **5** of IS 302-2-9 (1993) shall apply except as follows:

The rated input of electric toasters shall be one of the following:

600, 750, 1 000, 1 250 watts.

7 CLASSIFICATION

7.1 Clause **6** of IS 302-2-9 (1993) shall apply.

8 MARKING

8.1 Clause **7** of IS 302-2-9 (1993) shall apply.

8.2 The toasters may also be marked with the Standard Mark.

9 SAFETY REQUIREMENTS

9.1 The toaster shall comply with the requirements given in **8** to **32** of IS 302-2-9 (1993).

10 LIST OF MEASUREMENTS AND TESTS

10.1 The following tests shall be carried out on the toasters:

- Overall dimensions (*see* **11**)
- Length of the flexible cord (*see* **12**)
- Mass of the appliance (*see* **13**)
- Number and dimensions of the toasting chambers, toasting surfaces and heating elements (*see* **14**)
- Force necessary to operate the bread carriage (*see* **15**)
- Toasting time (*see* **19**)
- Evenness of browning (*see* **20**)
- Browning control characteristic (*see* **21**)
- Endurance (*see* **22**)
- Finish (*see* **23**)

11 OVERALL DIMENSIONS

11.1 The measured dimensions shall be as declared by the manufacturer.

12 LENGTH OF THE FLEXIBLE CORD

12.1 The length between the point of entry of the cord to the toaster and the entry point in the plug. The measured length of the power supply cord external to the appliance shall be not less than 2·0 metres, if supplied with plug, or not less than 2·05 m if supplied without plug.

13 MASS OF THE APPLIANCE

13.1 The mass of the toaster shall be as declared by the manufacturer.

14 NUMBER AND DIMENSIONS OF THE TOASTING CHAMBERS, TOASTING SURFACES AND HEATING ELEMENTS

14.1 The number of the toasting chambers into which the bread slices can be placed to be toasted on both sides simultaneously, or of the toasting surfaces on which the bread slices are put to be toasted on one side at a time, is determined and indicated. For each toasting chamber or toasting surface, the dimensions — length, height, width, which are applicable — are determined and indicated in millimeters. In case of variable toasting chambers and toasting surfaces, the maximum dimensions are given. Also, the number of the heating elements is determined and the dimensions length and height are indicated in millimeters.

The dimensions of the largest slice of bread having a thickness of 10 mm, which can be inserted into the toasting chamber without force or which can be placed on the toasting surface, are determined and indicated in millimetres.

The number of standard bread slices having dimensions of 90 mm × 90 mm × 10 mm which can be toasted at one time, on both sides or on one side only, with the 90 mm side horizontal in the toaster, is determined and indicated.

The measured dimensions of toasting chamber, toasting surfaces and heating elements shall be as declared by the manufacturers.

15 FORCE NECESSARY TO OPERATE THE BREAD CARRIAGE

15.1 A spring balance is applied against the bread carriage lever as in normal use just prior to latching the bread carriage. The maximum force necessary is measured and indicated rounded downwards to the nearest newton.

The force necessary to operate the bread carriage shall not vary by more than 10 percent of the value declared by the manufactuer.

16 PREPARATION OF BREAD FOR TOASTERS

16.1 The measurements according to **17** to **21** are made with white bread of the following recipe: 100 parts wheat flour, 55 to 60 parts water according to the quantity of water that the flour will absorb, 4 parts fat (peanut shortening), 2·5 parts fresh yeast, 1·5 parts sugar, 2 parts salt.

All ingredients are put simultaneously into the bowl of a kneading machine and kneaded carefully until the dough falls easily from the wall of the bowl taking into account the relevant manufacturer's instructions. The dough is then allowed to rise at a temperature of 40-50°C for about 30 min. After the rising process, the dough is kneaded again by hand for about 3 min and divided into pieces, each of 1 250 grams. These pieces are put into open tins made of 1 mm tinned steel sheet, according to Annex D, and allowed to rise approximately to twice their original volume at a temperature of 40-50°C. The total time from the end of the kneading time should not exceed 60 min. The bread is then baked at 230°C, for about 40 min.

The fresh-baked loaves are stored for 24 ± 4 h in a draught-free room away from direct sunlight at a ambient temperature of 27 ± 2°C and a relative humidity of 50 ± 10 percent. The loaves are then cut into slices of 10 mm thickness. The three end slices of each loaf are discarded, the remaining slices are put into suitable plastic bags.

The storage plastic bags is necessary to avoid a further moisture loss, since the duration of the test is considerably longer than normal toasting time. The storage time in the bags, however, shall not exceed 8 h.

The toasting tests can also be made with other types of white bread, commonly available in the country, but care has to be taken that, if more than one loaf is necessary, bread from the same batch is used and treated the same way.

For all the following tests, the bread slices are used with crusts and the slices are inserted in such a way that the dimension 90 mm is the length and 90 mm is the height. Bread prepared according to the recipe given above will normally rise to a height of 90 mm, a height of up to 110 mm and a convex upper edge is tolerated, but the browning measurements are then made only on the part 90 mm × 90 mm.

If the largest slice stated by the manufacturer is greater than 90 mm × 90 mm, the test is repeated with bread of the manufacturer's dimensions, the browning measurement being made over the whole area.

17 BROWNING CONTROL SETTING

17.1 The browning control is set to a medium position or to the position for medium brownness (golden brown) declared by the manufacturer. Starting from 'cold' or after a pre-heating time in case of manufacturer's instructions, with the toaster fully loaded two toasting cylces are made, with an interval of 15s or longer if recommended by manufacturer according to **20** the average brownness of both sides of each slice of the second cycle is determined. It shall be in the range of 40 percent to 60 percent.

If this result is not reached, the appliance is cooled completely and two further cycles are made with an appropriate corrected setting.

If the correct setting should not be reached with second attempt, it may be found generally by an interpolation with the results of the cycles made.

18 TOASTING

18.1 Starting from 'cold' or after a pre-heating time in case of manufacturer's instructions, five toasting cycles with the toaster fully loaded are made with an interval between each other of 15 s or longer if recommended by the manufacturer, the browning control being set at the position predetermined in **17**. This setting is kept throughout the five cycles unless instructions for an appropriate correction are given by the manufacturer.

In the case of toasters without a browning control, the toasting cycle is supervised and the slices are removed when an average brownness of 40-60 percent is reached.

In the case of toasters without a browning control, it may be necessary to make several cycles, in order to determine the time to reach medium brownness.

In the case of toasters which toast only one side at a time, the slices are turned over when the side toasted first has reached the desired brownness.

The setting of the browning control and any correction made are determined and indicated.

It is recommended that all the slices be inserted in the toaster with the 90 mm side horizontal. The top edge of each slice should be marked, and after toasting the slices are arranged in accordance with the position they had in the toaster.

19 TOASTING TIME

19.1 The pre-heating time, if any, and the time for each of the first three toasting cycles is determined and indicated in minutes and seconds.

It is recommended that a schedule as shown in Annex A be used for the presentation of the result.

The toasting time shall be 60 to 70 seconds minimum and 170 to 180 seconds maximum.

20 EVENNESS OF BROWNING

20.1 The toasting result is expressed by the brownness the slices have reached in the toasting process. Brownness is defined by (%) = 100 (%) – needle deflection of the galvanometer (%). Colour white corresponds to 0 percent brownness and black to 100 percent. For the measuring device, *see Annex* C.

The toasted bread slices are allowed to cool down. The brownness is measured in the areas shown in *Annex* B on each side of all of the slices.

The maximum and minimum values as well as the average of each side are indicated. The average value is calculated by the formula:

$$b\,[\,av\,] = (\,b_1 + b_2 + b_3 + b_4\,)/4$$

It is recommended that a schedule as shown in *Annex* A be used for the presentation of the results in **18**.

20.1.1 In the case of non-automatic toaster, a sufficient number of slices shall be toasted to prove that the toast is evenly browned and is of a reasonable texture.

20.1.2 In the case of automatic toaster, the browning control shall be set to produce toast evenly browned and of a reasonable texture, and a sufficient number of slices shall be toasted to ensure that, at this setting, the browning does not vary appreciably as the toaster heats up, nor when the supply voltage is varied between ±5 percent of the test voltage.

20.2 The maximum, minimum and average value for evenness of browning shall be as declared by the manufacturer.

21 BROWNING CONTROL CHARACTERISTIC

21.1 This measurement, based on test conditions given in **16** to **20**, is made on a sufficient number of position of the browning control. Starting from cold or pre-heating period if recommended by the manufacturer, for each position of the browning control, with the toaster fully loaded, three cycles are made but only the slices from the last cycle are measured.

For each position of the browning control, the average of the complete load is indicated on a curve expressed as percent of browning as a function of browning control setting.

Percentage of browning as a function of browning control setting shall be as declared by the manufacturer.

22 ENDURANCE

22.1 Toasters shall be so constructed that, in normal use, there will be no electrical or mechanical failure that might impair compliance with this standard. The insulation shall not be damaged and contacts and connections shall not work loose as a result of heating, vibration, etc.

Moreover the overload protection devices shall not operate under normal running conditions.

22.2 The toaster shall be connected to the supply and operated at an input of 1·15 times the maximum rated input. The toaster shall be operated for a total operating period of 200 hours in cycles of 3 minutes 'ON' and 2 minute 'OFF'. During the period, the toaster shall be empty and closed.

22.3 After the test of **23.2** the toaster shall withstand the electric strength of test as given in **16.4** of IS : 302-1 (1979).

23 FINISH

23.1 The external finish used in metal components shall be of a heat and moisture resisting nature and shall not be adversely affected by variation in temperature occuring under normal operating conditions or after the endurance test.

24 FUNCTIONAL PROVISIONS

24.1 The means and the method for the removal of bread crumbs shall be given in the instruction sheet wherever applicable.

24.2 Whether the toaster is provided with a non-detachable cord or with an appliance-inlet with or without a cord set shall be indicated in the instruction sheet wherever applicable.

24.3 For bread carriage or turn-over device, following shall be indicated in the instruction sheet wherever applicable:

a) The type of bread carriage provided, that is lifting device, tilting device.

b) Whether the bread slices can be removed before the toasting process has ended, that is by hand-releasing of the mechanism.

c) Determine the amount by which the bread slices of 90 mm height project over the frame of the toaster when the bread carriage is in its upper position.

d) The effectiveness of the bread carriage damping if the bread slices are ejected from the toasting chamber when the bread carriage is released either automatically or by hand.

e) For toaster which toast only one side at a time, the means provided for turning the toast, that is slideway.

25 TESTS

25.0 Categories of Tests

Tests are classified as type, acceptance and routine tests.

25.1 Type Tests

The tests specified in Table 1 shall constitute the type test and shall be carried out on two samples of toaster of the same type and rating selected preferably at random from a regular production lot. Before commencement of the test, the toaster shall be visually examined and inspected for obvious visual defects in respect of components, parts and their assembly, construction, mechanical hazards, markings, provison, of suitable terminals for supply connections, earthing and the effectiveness of screws and connections. The external surface finish shall be even and free from finishing defects.

25.1.1 *Criteria of Acceptance*

Both samples shall successfully pass all the type tests for proving conformity with the requirements of the standard, if any of the samples fails in any of the type tests, the testing authority, at its discretion, may call for fresh samples not exceeding twice the original number and subject them again to all tests or to the test(s) in which failure(s) had occurred. No failure should be permitted in the repeat test(s).

Table 1 Schedule of Type Test

(*Clause* 25.1)

Sl No.	Tests	Clause Reference
1	Safety requirements	8 to 32 of IS 302-2-9 (1993)
2	Overall dimensions	11
3	Length of flexible cord	12
4	Mass of the appliance	13
5	Dimension of the toasting chambers, toasting surfaces and heating elements	14
6	Force necessary to operate the bread carriage	15
7	Toasting time	19
8	Evenness of browning (Under consideration)	20
9	Browning control characteristics	21
10	Endurance	22
11	Finish	23
12	Functional provisions	24

25.2 Acceptance Tests

The following shall consitute the acceptance tests:

Test	*Clause Reference*
a) Protection against electric shock	8 of IS : 302-2-9 (1993)
b) Input	10 ,, ,, ,,
c) Temperature rise	11 ,, ,, ,,
d) Electrical insulation and leakage current at operating temperature	13 ,, ,, ,,
e) Moisture resistance	15 ,, ,, ,,
f) Insulation resistance and electric strength (after humidity treatment)	16 ,, ,, ,,
g) Provision for earthing	27 ,, ,, ,,
h) Force necessary to operate the bread carriage	15 ,, ,, ,,
j) Toasting time	19 ,, ,, ,,

NOTE — For the purpose of acceptance test, the humidity treatment shall be done for 24 hours while conducting the test for moisture resistance [*see* 15 of IS 302-1 (1979)].

25.2.1 A recommended sampling procedure for acceptance test is given in Appendix B of IS 302-1 (1979).

25.3 Routine Tests

The following shall constitute the routine tests:

Test	*Clause Reference*
a) Protection against electric shock	8 of IS : 302-1 (1979)
b) High voltage	do
c) Provision for earthing	do

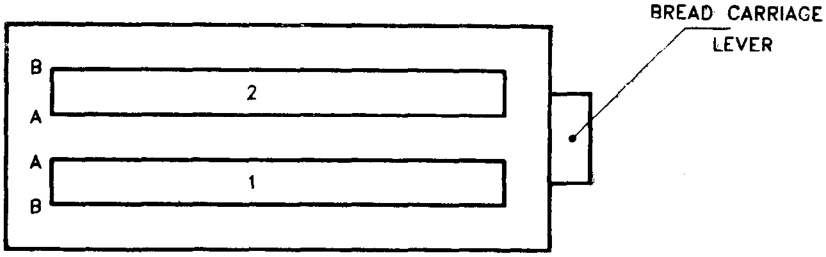
ANNEX A

(*Clauses* 19.1 *and* 20.1)

SCHEDULE FOR THE PRESENTATION OF THE TOASTING RESULTS

(Example for a 2-slice toaster)

Toasting Cycle	Slice		Browning Measuring Areas				Browning			Toasting Time
	No.	Side	1	2	3	4	*Max*	*Min*	Average	
Preheating time (if any)										
1	1 2	A B A B								
2	1 2	A B A B								
3 4 5	as for 1 and 2									



The bread slices and their sides are denoted according to their position in the toaster as shown in the diagram.

ANNEX B

(*Clause* 20.1) and *Annex* C

POSITION OF THE BROWNING MEASURING AREAS FOR ONE SIDE, ON A STANDARD BREAD SLICE

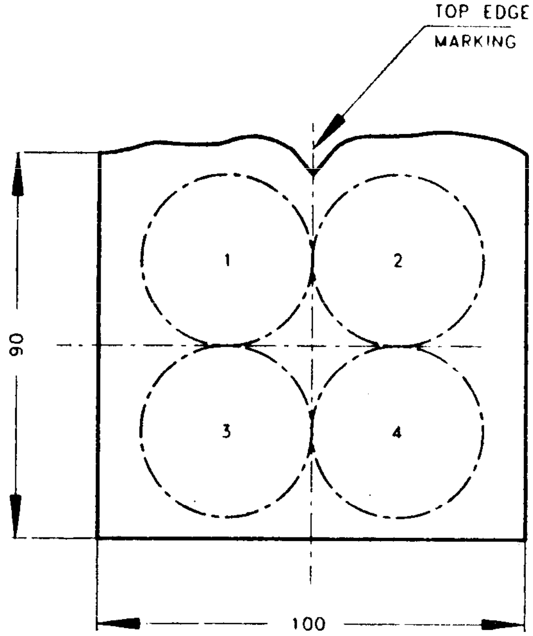


FIG. 1 POSITION OF BREAD FOR BROWNING MEASUREMENT

NOTE — The sequence of marking is maintained for both sides.

ANNEX C

(*Clause* 20.1)

BROWNING MEASURING DEVICE

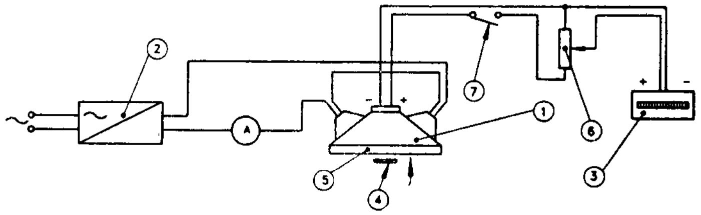


FIG. 2 ARRANGEMENT OF THE MEASURING INSTRUMENTS.

1 = reflectometer (for details *see* Fig. 3).

2 = stabilizer with an accuracy of 0·1 percent with a regulating transformer output, suitable for reflectometer lamps.

3 = galvanometer with a scale calibrated from 0 percent to 100 percent, suitable for use with the photo-element.

4 = for calibration: white reference surface, barium sulphate 99 percent without protection-cover

For measurements: bread slices.

NOTE — For the measurements, the reflectometer is placed directly in contact with the bread slices at the areas shown in Appendix B and the needle deflection is determined.

5 = aperture.

6 = potentiometer suitable for the calibration of the galvanometer.

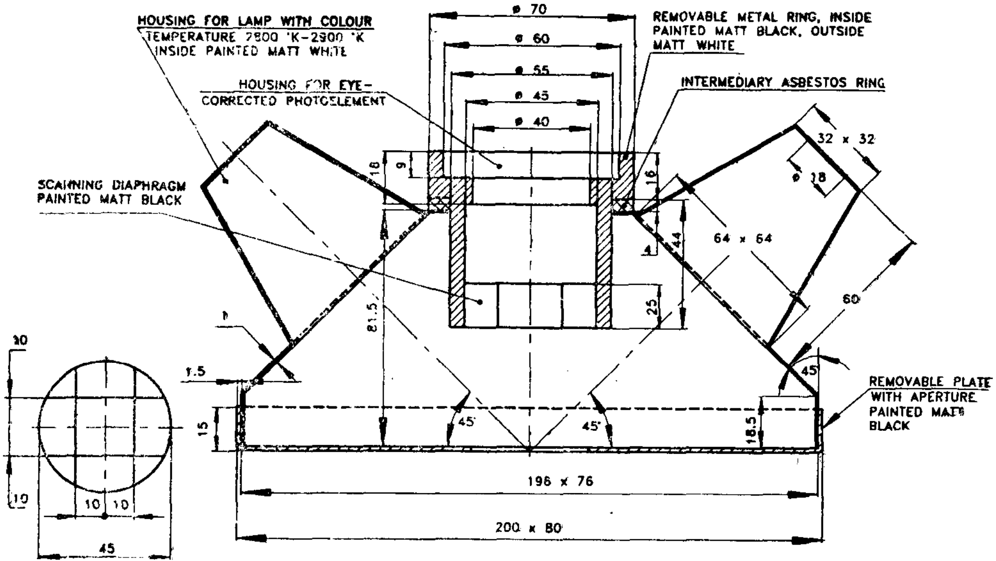
7 = switch.

Calibration of browning measuring device:

The regulating transformer is adjusted so that the instrument shows the current for the lamps necessary to give a colour temperature of 2 854°K (standard light source according to CIE).

NOTE — The colour temperature of the lamps for use in the reflectometer is calibrated by the lamp manufacture, by colour matching with a special calibration lamp. The lamp supplier will indicate the current (or the voltage) at which the presumed colour temperature will be reached.

For the calibration of the reflectometer, the lamps are switched on and the circuit to the galvanometer is interrupted by the switch (7). The needle of the galvanometer is adjusted exactly to 0 percent. The switch (7) is then closed again and, approximately 10 min after that, the white reference surface (4) is placed directly in contact with the reflectometer under the appropriate aperture. The potentiometer (6) is then adjusted to give a galvanometer deflection of 100 percent (white).


HOUSING FOR LAMP WITH COLOUR TEMPERATURE 2800 °K–2900 °K INSIDE PAINTED MATT WHITE
HOUSING FOR EYE-CORRECTED PHOTOELEMENT
SCANNING DIAPHRAGM PAINTED MATT BLACK
REMOVABLE METAL RING, INSIDE PAINTED MATT BLACK, OUTSIDE MATT WHITE
INTERMEDIARY ASBESTOS RING
REMOVABLE PLATE WITH APERTURE PAINTED MATT BLACK
ø 70
ø 60
ø 55
ø 45
ø 40
18
9
16
44
4
25
81.5
32 x 32
ø 18
64 x 64
60
45°
45°
45°
15
18.5
1.5
196 x 76
200 x 80
10
10
10
10
45

All dimensions in millimetres.

FIG. 3 DETAILS OF REFLECTOMETER

ANNEX D

BAKING TIN

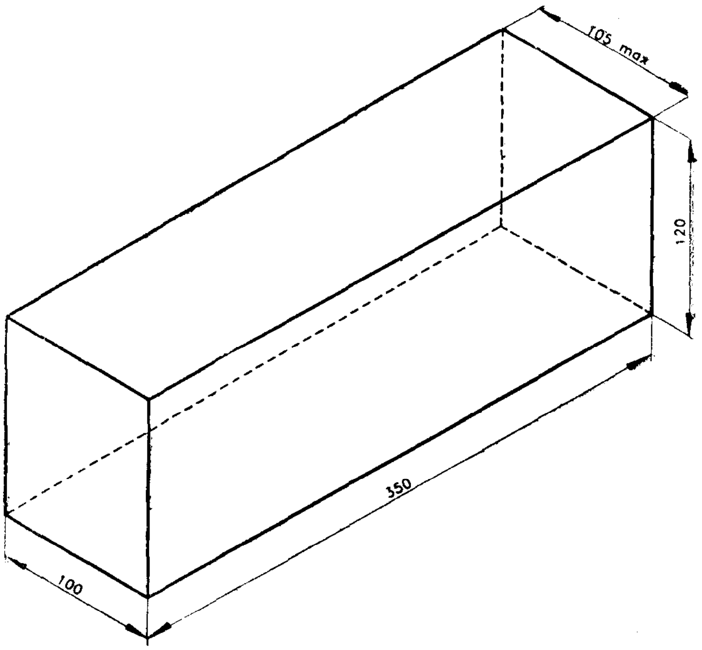


FIG. 4 INTERNAL DIMENSIONS

All dimensions shown are internal dimensions and internal radial should be less than 2 mm.

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